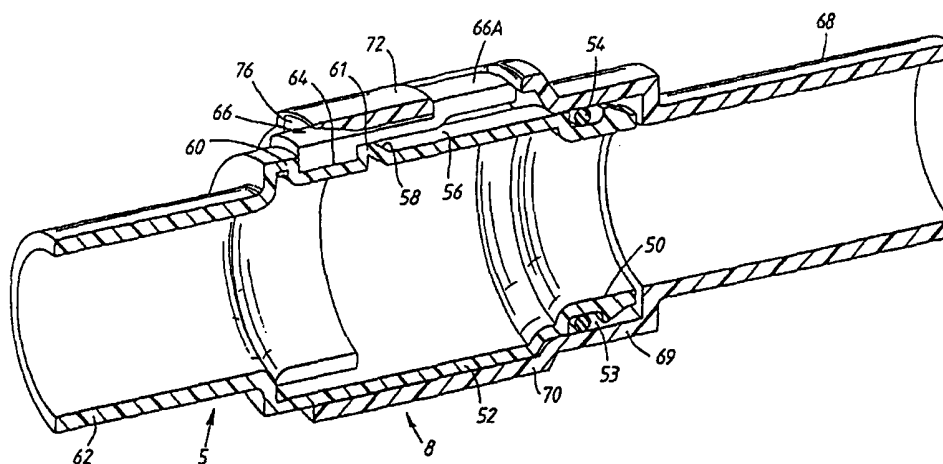




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|-----------|--|
| (51) International Patent Classification ⁶ : F16L 37/084 | A1 | (11) International Publication Number: WO 99/34143 (43) International Publication Date: 8 July 1999 (08.07.99) |
| (21) International Application Number: PCT/GB98/03434 (22) International Filing Date: 13 November 1998 (13.11.98) (30) Priority Data: 9727284.3 24 December 1997 (24.12.97) GB (71) Applicant (for all designated States except US): DRAFTEX INDUSTRIES LIMITED [GB/GB]; 7 Castle Street, Edinburgh EH2 3AP (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): RENOU, Loïc [FR/FR]; 12, avenue des Aquarelles, F-44300 Nantes (FR). RE-NAUD, Frédéric [FR/FR]; Chez Monsieur et Madame Les-cure, 12, rue de Hirschau, F-68260 Kingersheim (FR). (74) Agent: MATHISEN, MACARA & CO.; The Coach House, 6-8 Swakeleys Road, Ickenham, Uxbridge, Middlesex UB10 8BZ (GB). | | (81) Designated States: US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> |

(54) Title: CONNECTION OF EXTRUDED OR MOULDED PARTS



(57) Abstract

An extruded or blow-moulded pipe, such as incorporating corrugations to render it at least partially flexible, has an integrally extruded connection part (5) by means of which the pipe can be locked and sealed to a rigid tubular fixture (68). The connection part (5) carries a resiliently cantilevered locking member (66) which has an enlarged end (66A). The latter is biased in a radially inward direction when the connection part (5) is inserted in the fixture (68) but then resiles outwardly to become located in an aperture (78) formed in the fixture (68) and secures the two parts against both relative longitudinal and relative rotational movement.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|--|----|--|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | | | TR | Turkey |
| BG | Bulgaria | HU | Hungary | ML | Mali | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MN | Mongolia | UA | Ukraine |
| BR | Brazil | IL | Israel | MR | Mauritania | UG | Uganda |
| BY | Belarus | IS | Iceland | MW | Malawi | US | United States of America |
| CA | Canada | IT | Italy | MX | Mexico | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NE | Niger | VN | Viet Nam |
| CG | Congo | KE | Kenya | NL | Netherlands | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NO | Norway | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | NZ | New Zealand | | |
| CM | Cameroon | | | PL | Poland | | |
| CN | China | KR | Republic of Korea | PT | Portugal | | |
| CU | Cuba | KZ | Kazakhstan | RO | Romania | | |
| CZ | Czech Republic | LC | Saint Lucia | RU | Russian Federation | | |
| DE | Germany | LI | Liechtenstein | SD | Sudan | | |
| DK | Denmark | LK | Sri Lanka | SE | Sweden | | |
| EE | Estonia | LR | Liberia | SG | Singapore | | |

CONNECTION OF EXTRUDED OR MOULDED PARTS

The invention relates to an assembly, comprising a hollow tubular-walled extruded or blow-moulded connection part and a hollow tubular-walled fixture part, a first one of the parts being inserted into the second thereof to a predetermined extent, and an interlock member mounted on one part and resiliently supported thereon to allow it to be bent against its resilience during insertion of the first part into the second part, the interlock member then resiling to secure the two parts together against relative longitudinal movement.

Such an assembly is shown in EP-A-0 573 863. In this assembly, however, interlock members on one part are provided which interlock with a peripheral edge on the other part. The two parts are therefore secured against relative longitudinal movement but not against relative rotational movement. The invention is concerned with this aspect.

Accordingly, the assembly as first set forth above is characterised in that the interlock member is mounted on the first part, and the second part has aperture means into which a locking part of the interlock member resiles so as to secure the two parts together also against relative rotating movement.

Extruded and blow-moulded parts for use in motor vehicle body construction, and methods of connecting them, according to the invention, will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a longitudinal view, partly in section, of one of the parts showing its connection to another part; and

Figure 2 is an exploded view corresponding to Figure 3 but showing the two parts before their connection.

Referring to Figure 1, a pipe having a connection part 5 is produced by a blow-moulding technique. In this example, the pipe is a flexible pipe made of thermoplastic material and incorporates corrugations (not shown) to increase its flexibility; such a pipe may be used as an air duct, a cooling water hose or a fuel tank filler hose in a motor vehicle, for example. In use, the pipe is to be secured to a tubular fixture which is rigid with a pipe 68. The fixture could be a rigid tube or pipe associated with the air filter, cooling system or fuel tank of the vehicle, depending on the application. The fixture may be produced (such as by injection-moulding) from suitable plastics material or may be made of metal or other suitable material.

The connection part 5 has a distal end region 50 of reduced diameter which merges with a region 52 of enlarged diameter, the region 50 defining a circumferential groove 53 carrying an O-ring 54. As shown in Figure 2, the enlarged region 52 is provided with an axially directed slot 56 which is open at one axial end and closed by a wall 58 at the opposite axial end. Two circumferential walls 60 and 61 extend partially around the enlarged region 52 to define a groove 64 which extends equally on both sides of the slot 56. Wall 60 merges with a pipe part 62 which, in turn, merges with the corrugations (not shown) of the pipe 4.

A separately moulded locking element 66 has one end shaped to be fitted and secured in the groove 64, so that its head 66A extends in cantilever fashion over the slot 56.

The pipe 68 has an intermediate circumferentially extending region 69 merging with an enlarged region 70 which has a part 72 of locally greater diameter. The part 72 defines a slot 76 (see Figure 1) and is formed with an aperture 78 (Figure 2).

In order to connect the connection part 5 to the pipe 68, the connection part 5 with the clip 66 in position thereon is inserted into the enlarged part 72 of the fixture 8, with the two parts being angularly aligned with each other so that the clip

66 slides through the inverted slot 76 as shown in Figure 1. In order for this sliding movement to be possible, the enlarged head 66A of the clip 66 is bent downwards by contact with the inverted base of the slot 76, this bending being accommodated by the cantilevered body 66B of the clip 66. Relative axial movement of the connectors 5 and 8 continues until the distal end region 50 becomes located within the region 69, with the O-ring 54 being in sealing contact with this region. In this position, the head 66A of the clip 66 becomes located in alignment with the aperture 78 (Figure 2) and snaps into position within this aperture as shown in Figure 1. The two pipes cannot now be axially separated or moved radially with respect to each other.

The two pipes can be rapidly connected together. Such an interlocking arrangement provides a rapid means of connecting the flexible pipe 4 to the pipe 30 and avoids the use of separate connectors which have to be welded, over-moulded, or force-fitted onto the pipes, thus creating one or more supplementary interfaces with the pipes, such supplementary interfaces increasing the risk of failure or leakage and also being expensive.

CLAIMS

1. An assembly, comprising a hollow tubular-walled extruded or blow-moulded connection part (5) and a hollow tubular-walled fixture part (68), a first one of the parts (5) being inserted into the second (68) thereof to a predetermined extent, and an interlock member (66) mounted on one part (5) and resiliently supported thereon to allow it to be bent against its resilience during insertion of the first part (5) into the second part (68), the interlock member (66) then resiling to secure the two parts (5,68) together against relative longitudinal movement, characterised in that the interlock member (66) is mounted on the first part (5), and the second part (68) has aperture means (78) into which a locking part (66A) of the interlock member (66) resiles so as to secure the two parts (5,68) together also against relative rotating movement.

2. An assembly according to claim 1, characterised in that the connection part (5) is inserted into the fixture part (68).

3. An assembly according to claim 1 or 2, characterised in that the first part (5) includes means for locating a sealing member (21) for sealing between the connection part (5) and the fixture part (68).

4. An assembly according to any preceding claim, characterised in that the interlock member (66) is mounted externally on the surface of the first part (5) and extends in resiliently cantilevered form towards and into the interior of the second part (68), the locking part of the interlock member (66) comprising a formation (66A) protruding therefrom in a radially outward direction, and the aperture means comprising an aperture (78) formed in the tubular wall of the second part (68) and substantially matching the size and shape of the formation (66A).

1/2

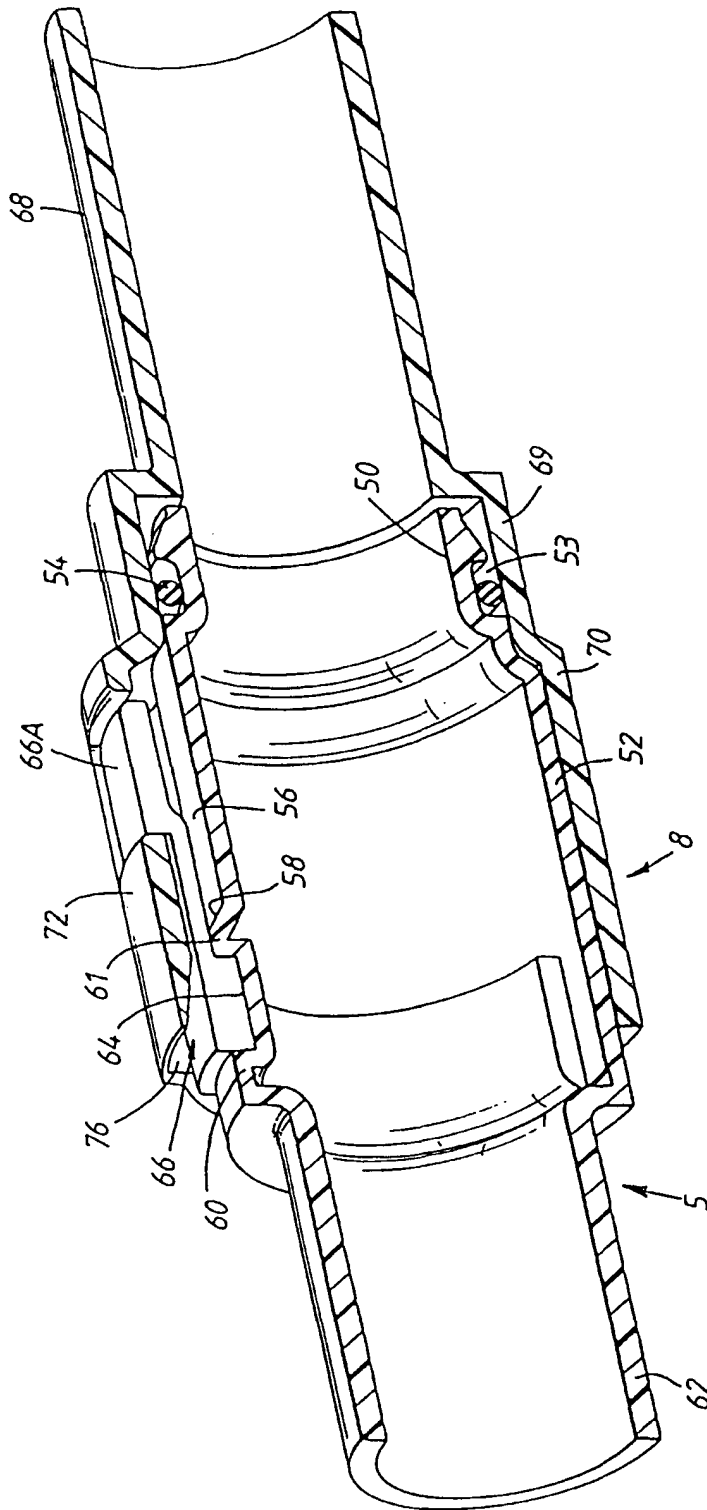
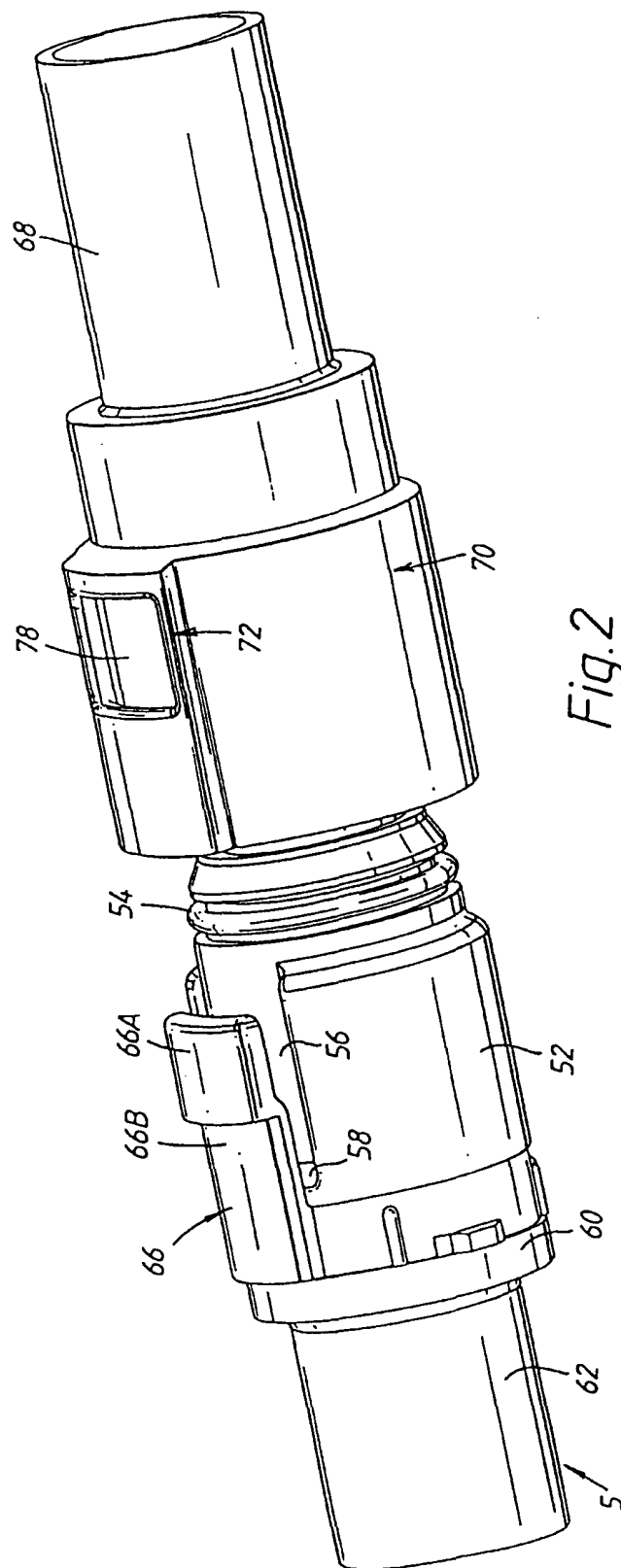


Fig.1

2/2



INTERNATIONAL SEARCH REPORT

In ternational Application No

PCT/GB 98/03434

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 F16L37/084

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | FR 2 430 216 A (MAUZ & PFEIFFER PROGRESS) 1 February 1980 see page 1, line 1 - line 6 see page 4, line 12 - line 13 see figures 1-3 | 1-3 |
| A | --- | 4 |
| X | EP 0 579 141 A (CONTINENTAL AG) 19 January 1994 see column 1, line 44 - line 54 see column 4, line 44 - line 45 see figures 1-4 | 1,2 |
| A | --- | 3,4 |
| X | US 5 667 329 A (YODER JR JAMES HERBERT) 16 September 1997 see abstract; figures 2,5 | 1,2 |
| A | --- | 3,4 |
| | -/- | |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

26 January 1999

Date of mailing of the international search report

04/02/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Brosio, A

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/03434

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|---|-----------------------|
| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | US 4 114 927 A (BUTCHER NORMAN P) 19 September 1978 see abstract; figures 1,2,6 --- | 1,2 |
| A | DE 12 26 841 B (COMPAGNIE DE PONT-À-MOUSSON SOCIÉTÉ ANONYME) 13 October 1966 see column 1, line 2 see column 2, line 31 - line 33 see figures 1-4 --- | 1-4 |
| A | DE 296 05 642 U (BARTLEWSKI JUERGEN) 30 May 1996 see page 3, line 30 - line 34 see page 5, line 22 - page 6, line 10 see page 10, line 27 - line 29 see figures 1-3,5,6 ----- | 1,2,4 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 98/03434

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|----------------------------|---------------------|
| FR 2430216 | A | 01-02-1980 | DE 2829938 A | 24-01-1980 |
| | | | GB 2028945 A | 12-03-1980 |
| EP 0579141 | A | 19-01-1994 | DE 4223251 A | 20-01-1994 |
| | | | DE 59301533 D | 14-03-1996 |
| | | | ES 2083803 T | 16-04-1996 |
| | | | US 5375892 A | 27-12-1994 |
| US 5667329 | A | 16-09-1997 | NONE | |
| US 4114927 | A | 19-09-1978 | NONE | |
| DE 1226841 | B | | NONE | |
| DE 29605642 | U | 30-05-1996 | NONE | |